

Concepts of *Gulpha Pradesha* in Ayurveda

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ABSTRACT

The ankle joint is between the leg and the foot. It is the synovial joint of hinge variety. This joint is formed by three bones- tibia, fibula and talus. The articular surface is covered with hyaline cartilage. There are three ligaments attached to this joint- Capsular ligament, Medial ligament and Lateral ligament. Medial and lateral ligament are strongest. They are responsible for stability of the Ankle Joint. Ankle joint performs dorsiflexion and plantar flexion movements. In Ayurveda ankle joint resembles *Gulpha Pradesha* or *Gulpha Sandhi*. According to *Acharyas* it is the vital point (*Marma*) of body.

KEYWORDS: Ankle joint, ligaments, movements, Gulpha, Marma

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INTRODUCTION

Modern aspect of *Gulpha Pradesha* (Ankle joint)-

Ankle joint is the synovial joint of hinge variety. This joint is situated between the leg and the foot. The wedge shaped trochlea of talus fits into the socket formed by the medial malleolus and inferior surface of the lower end of the tibia and lateral malleolus of the fibula. Hyaline cartilage covered the articular surface of the joint. This joint is also called the "talocrural articulation".

➤ **LIGAMENTS-** There are three ligaments present in the ankle joint.

1. Capsular ligament.
2. Deltoid or medial ligament or medial collateral ligament.
3. Lateral ligament or lateral collateral ligament.

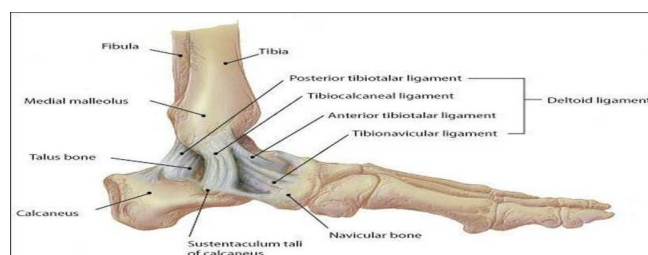
1. Fibrous Capsule/ Capsular ligament

It surrounds the joint completely. It is attached to the articular margins of the joint all around with two exceptions. Posterosuperiorly it is attached to the inferior transverse tibiofibular ligament. Anteroinferiorly it is attached to the dorsum of the neck of talus at some distance from the trochlear surface. The joint capsule is thin in front and behind to allow hinge movements and thick on either side where it blends with the collateral ligaments. The synovial membrane lines the inner surface of the joint capsule, but ceases at the periphery of the articular cartilages.

2. Deltoid or Medial Ligament

This ligament is also called medial collateral ligament. It is a very strong triangular ligament on the medial side of the ankle. It is divided into two parts: -superficial and deep. Above, both the parts have a common attachment to the apex and margins of the medial malleolus. Below, the attachment of superficial and deep parts differs as under:

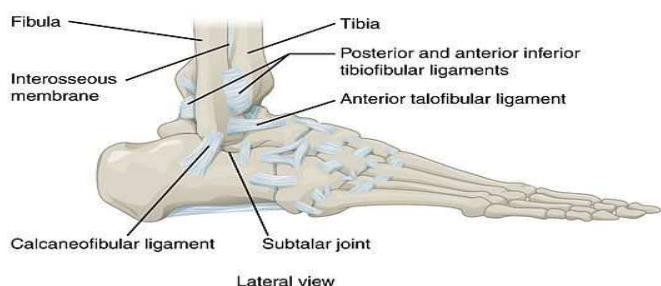
- Superficial part: Its fibres are divided into three parts: anterior, middle, and posterior.
 - A. Anterior fibres (tibionavicular) are attached to the tuberosity of navicular bone and the medial margin of spring ligament.
 - B. Middle fibres (tibiocalcaneal) are attached to the whole length of sustentaculum tali.
 - C. Posterior fibres (posterior tibiotalar) are attached to the medial tubercle and adjoining part of the medial surface of talus.
- Deep part (anterior tibiotalar) is attached to the anterior part of the medial surface of talus.



3. Lateral Ligament

The lateral ligament also called lateral collateral ligament. It consists of three parts: -Anterior talofibular, posterior talofibular, and calcaneofibular.

1. Anterior talofibular ligament is a weak flat band, which extends forward and medially from the anterior margin of lateral malleolus, to the neck of talus just in front of the fibular facet.
2. Posterior talofibular ligament is a strong band, which extends backward and medially from the posterior margin of the lateral malleolus to the posterior tubercle of the talus.
3. Calcaneofibular ligament is a long rounded cord, which runs downward and backward from the notch on the lower border of lateral malleolus to the tubercle on the lateral surface of the calcaneum.



Stability of the Ankle Joint- Stability of this joint depends on some factors, mention as below-

- Close interlocking of its articular surfaces.
- Deepening of tibiofibular socket posteriorly by the inferior transverse tibiofibular ligament.
- Strong, medial, and lateral collateral ligaments.
- Tendons (four in front and five behind) crossing the ankle joint.

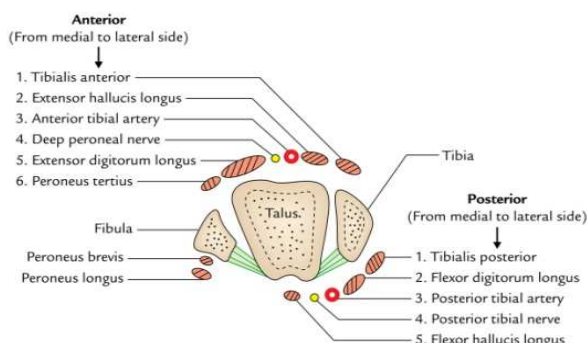
Relations of the Ankle Joint (transverse section of the Ankle Joint)-

Anterior: Anteriorly from medial to lateral side the ankle joint is related to the following structures:

1. Tibialis anterior.
2. Extensor Hallucis longus.
3. Anterior tibial Artery.
4. Deep peroneal Nerve.
5. Extensor Digitorum longus.
6. Peroneus tertius.

Posterior: Posteriorly from medial to lateral side the ankle joint is related to the following structures:

1. Tibialis posterior
2. Flexion Digitorum longus.
3. Posterior tibial Artery.
4. Posterior tibial Nerve.
5. Flexor Hallucis longus.



Movements - The following movements take place at the ankle joint:

1. Dorsiflexion
2. Plantar flexion

MOVEMENTS	PRINCIPAL MUSCLES	ACCESSORY MUSCLES
Dorsiflexion	Tibialis anterior muscle	1. Extensor Digitorum longus muscle 2. Extensor hallucis longus muscle 3. Peroneus tertius muscle
Planter Flexion	1. Gastrocnemius muscle 2. Soleus muscle	1. Plantaris muscle 2. Tibialis posterior muscle 3. Flexor Hallucis Longus muscle 4. Flexor Digitorum Longus muscle

Arterial Supply-

It is by the malleolar branches of anterior tibial, posterior tibial and peroneal arteries.

Nerve Supply-

Branches of deep peroneal and tibial nerves.

Clinical correlation -

1. Ankle sprains :-

The excessive stretching and tearing of ligaments of the ankle joint is called the ankle sprain. The ankle sprains are normally caused by the falls from height or twists of ankle. When the plantar-flexed foot is excessively inverted, the anterior and posterior talofibular and calcaneofibular ligaments are stretched and torn. The anterior talofibular ligament is most commonly torn.



2. Dislocation of the ankle:-

The dislocations of ankle joint are rare because it is a very stable joint due to tibiofibular mortise. However, whenever dislocation occurs it is always accompanied by the fracture of one of the malleoli.

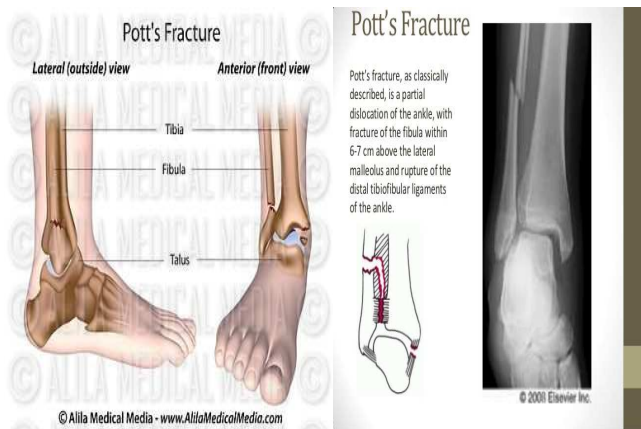
3. Pott's fracture or Dupuytren fracture-

It occurs when the foot is caught in the deep hole and everted forcefully. In this condition, the following sequence of events takes place:-

1. Oblique fracture of the lateral malleolus due to internal rotation of the tibia.

2. Transverse fracture of the medial malleolus due to pull by deltoid ligament.
3. Fracture of the posterior margin of the lower end of tibia because it is carried forward.

These stages are also termed first, second, and third degree of Pott's fracture, respectively. The third degree of Potts fracture is also called trimalleolar fracture.



Ayurvedic aspect of Gulpha Pradesh- Nirukti-

यन्त्रोपापरोषितकोशांशःकल्पद्रुमः- गुल्फः, पुं, (गल + “कलिगलिभ्यां फगस्योच्च ।” उणां । ५ । २६

अमरकोशः-गुल्फ पुं । पादग्रन्थी । समानार्थकःघुटिका,गुल्फ 2।6।72।1।2

वाचस्पत्यम्- "गुल्फ" पु. गुल--फक् नि. अस्योच्च । पादग्रन्थौ।

Pramana (measurement) of Gulpha-

- ❖ Chaturdashangulparanihani Padgulfjanga | (Su.su.35 / 12)
- 14 finger circumference

Total no. of Sandhi, Snayu, Peshi, Jaal, Sanghata, Simanta, Marma in Gulpha Pradesh-

- ❖ Sandhi - 210, in branches - 68, Jānugulphavaṅkṣaṇeṣvêkaikaḥ (Su.sha .5 / 28)
- Sandhi prakāra - tēṣāmaṅgulimaṇibandhagulphajānukūrparēṣu kōrāḥ sandhayaḥ | (su.Śā. 5/32)
- **Types of sandhi** - These joints are of eight types- *Kora, Ulukhala, Samudga, Pratara, TunnaSevani, Vayasatunda, Mandala and Shankhavarta*. Of them, *Kora* joints are found in fingers, wrists, ankles, knees and elbows.
- *Kora sandhi* (Condylod) -4 blades *Khalla, sadansa, cakrakōra, paraspara* (pratyakṣa śārīra)
- ❖ Snāyu - 900, śākhāgata snāyu -600 tala, kūrca, gulpha - 30 | (su.Śā.5/35)
- ❖ Pēṣiyā- 500, śākhāgata pēṣiyā - 400 daśa gulphatalayōḥ, gulphajānvantarē vinśatiḥ | (su.Śā.5/46)
- ❖ Jāla-16, gulpha- 4-4 pratyēkaṁ catvāri; tāni maṇibandhagulphasaṁśritāni | (su.Śā. 5/12)
- ❖ Saṅghāta-14, gulpha 1-1 (su.Śā. 5/16)
- ❖ seemant-14, gulph 1-1 (su.sha.5/17)
- ❖ Marma- 107, According to shadang - shaakhaagat marm-44, sakthigat marm-11
- Tatr sakthimarmāni kshipr-talahriday-koorch-koorchashiro-gulfendrabasti jaanvaanyoorva-

lohitaakshaani vitapan cheti, etenetasakthi vyaakhyaataam | (su.sha. 6/6)

➤ *Kshipra, Talahridaya, Kurcha, Kurchashira, Gulpha, Indrabasti, Janu, Ani, Urvi, Lohitaksha* and *Vitapa*-one each. The same are in the other leg.

- Sandhi marma- 20, gulph- 2
- Jānukūrparasaṁantādhīpatigulphamaṇibandhakukundarāvar takṛkāṭikāścēti sandhimarmāni | (su.sha. 6/7, a.hr. sha. 5/44)
- *Janu, Kurpara, Simanta, Adhipati, Gulpha, Manibandha, Kukundara, Avarta* and *Krikatika* are *Sandhi Marmas*.

- ❖ Rujākaramarma- 8, gulpha- 2
- gulphau dvau maṇibandhau dvau dve dve koorchashiraanśi ch | (su.sha.6/14)
- *Gulpha* (two), *Manibandha* (two), *Kurchashira* (२ + २)- these eight *Rujakara Marmas*, cause pain.

Pramana of marma-

- ❖ Vid'dhyaṅguladvayamitaṁ maṇibandhagulphaṁ | (su.sha. 6/29 , a.hr.sha. 4/60)
- ❖ *Manibandha* and *Gulpha* are two fingers each (gulph -2 angula)

lakshan of asthi saar purush-

- ❖ paarshnigulphajaanu.....parvasthoola: | (ch.vi. 8/107)

Signs of long life age boy

- ❖ naatyupachitau naatyapachitau gulphau | (ch.sha. 8/51)
- Neither full of muscle nor covered with less muscle, that Gulpha or ankle is superior.
- naanaatmaj vikaar- gulphagrahashch | (ch.su. 20/11)
- Sparśagamyā ariṣṭa -**
- ❖ Gulphajānuvaṅkṣaṇa..... Sraṣṭāni vyastāni cyutāni sthānēbhyaḥ | (ca.I. 3/5)
- If we touches the the patient's Gulf, Janu, Vankshana etc. and it feels relaxed or separated from the place of joint then that man will die soon.

Treatment of Gridhrasi roga-

- ❖ Antarākāṇḍarāgulphaṁ sirā bastayagnikarma ca | gṛdhrasiṣu prayuñjīta || (ca.Ci. 28/101)
- ❖ In Gridhrasi disease,siravedhana between the tendon and the gulpha should be done,and anuvāsana and niruha basti given and cauterization between the tendon and the gulpha should be done.

Niruha basti kē yōgya rōgī-

- ❖ Sphigjānujaṅghōrugulphapārṣṇi.....parvāsthiśūla.... | (Ca.Si. 2/16)

symptoms of antrayama-

- ❖ Aṅguligulphajataḥ arāḥ dvakṣaḥ galasaṁśritah | snāyupratānamanilō yadā kṣipati vēgavān | (su.Ni.1/54)
- ❖ The vitiated vāyu (air) is established in the fingers, gulpha, abdomen, heart, thorax and throat and attacks the siras and snayus of the extremities.

Symptoms of trauma on marma-

- ❖ Gulphasandhēradha ubhayata: Kūrcaśirō nāma, tatra rujāśōphau | (su.Śā. 6/25)
- On both sides of the gulpha, there is a marma called *Kurchashira*, on which trauma causes pain and edema.

- ❖ Pādajaṅghayō: Sandhānē gulphō nāma, tatra ruja: Stabdhapādātā khañjatā vā | (su.Śā.6/25)
- ❖ There is a gulpha marma in the joints of the foot and the legs on which trauma causes pain and aggravation or stigma.

Symptoms of sandhi vidhha marma-

- ❖ vastu shookairivaakeernam roodhe ch kunikhanjata | balacheshtaakshay: shosh: parvashophashch sandhiye || (a.hr.sha. 4/51)
- ❖ The place of trauma appears to be full of spikes and produced Kunita or khanjata and the force and effort is destroyed, atrophy and swelling in the joints.

Purvaroopā of vata rakta

- ❖ Shyaavaarunamandalotpattishchaakasmaat paanipaadataalaanguligulphamanibandhaprabhrtishu | (su.chi. 5/4)

In reference to siravedhana-

Kroshatukashirsha-

- ❖ Khañjapaṅgulavātavēdanāsu jaṅghāyām gulphasyōpari caturaṅgulē | (su.Śā. 8/17)
- ❖ Caturaṅgulē ūrdhvaṁ gulphasya sakthyartau, tathā krōṣṭukaśīrṣakē | (a.Hra.Sū. 27/16)

Treatment of apachi-

- ❖ Ā gulphakarṇāt sumitasya jantōstasyāṣṭabhāgaṁ khuḍakādvibhajya | ghōṇarjuvēdhaḥ | (su.Ci. 18/26)
- From the ear (ankle) of the gulpha, measure it thoroughly and make a straight incision similar to the nostril except for the location of the eighth section (Indrabasti marma).

Treatment of shlipada-

- ❖ ślīpādēnilajā bhiṣak | kṛtvā gulphōpari sirām vidhyēttu caturaṅgulē | (su.Ci. 19/54)
- ❖ Gulphasyādhaḥ sirām vidhyēcchlipadē pittasambhavē | (su.Ci. 19/55)

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